

**AMENDMENT AND PRESENTATION OF CLAIMS**

Please replace all prior claims in the present application with the following claims.

1. (Currently Amended) A method of creating an atrioventricular bypass tract for a heart, comprising:  
growing mesenchymal stem cells *in vitro* into a strip with two ends;  
attaching one end of the strip onto the atrium of the heart, and  
attaching the other end of the strip to the ventricle of the heart, to create a tract connecting the atrium to the ventricle to provide a path for electrical signals generated by the sinus node to propagate across the tract and excite the ventricle.
2. (Original) The method of claim 1, wherein the steps of attaching are performed by suturing.
3. (Original) The method of claim 1, wherein the stem cells are adult human mesenchymal stem cells.
4. (Original) The method of claim 3, wherein the step of growing comprises growing the stem cells in culture on a nonbioreactive material.
5. (Original) The method of claim 4, wherein the step of growing is performed in an environment substantially free of any additional molecular determinants of conduction.
6. (Currently Amended) The method of claim 1, further comprising a step of adding a ~~gene~~ nucleic acid encoding a protein or peptide or biologically active fragment thereof to the mesenchymal stem cells by electroporation.
7. (Currently Amended) The method of claim 6, wherein the ~~gene~~ nucleic acid encodes ~~for~~ a connexin.

8. (Withdrawn) The method of claim 7, wherein the connexin includes connexin 40.
9. (Original) The method of claim 7, wherein the connexin includes connexin 43.
10. (Withdrawn) The method of claim 7, wherein the connexin includes connexin 45.
11. (Withdrawn-Previously Presented) The method of claim 6, wherein the step of adding a gene by electroporation includes adding genes that encode alpha and accessory subunits of an L-type calcium channel.
12. (Currently Amended) The method of claim 6, ~~wherein the step of adding a gene by electroporation includes adding the gene for connexins and~~ further comprising adding genes a nucleic acid that ~~encode~~ encodes alpha and accessory subunits of an L-type calcium channel.
13. (Withdrawn-Previously Presented) Use of mesenchymal stem cells to create an atrioventricular bypass tract for a heart wherein said tract provides a path for electrical signals generated by the sinus node to propagate across the tract and excite the ventricle, comprising growing mesenchymal stem cells into a strip having two ends, whereby one end of the strip is attached to the ventricle of a heart and the other end is attached to the atrium of the heart to create the atrioventricular bypass tract.
14. (Withdrawn) The use of mesenchymal stem cells of claim 13 wherein the mesenchymal stem cells are adult human mesenchymal stem cells.

15. (Withdrawn) The use of mesenchymal stem cells of claim 13 wherein the stem cells are grown in culture on a non-bioactive material.

16. (Withdrawn) The use of mesenchymal stem cells of claim 13 wherein the stem cells are grown in an environment substantially free of additional molecular determinants of conduction.

17. (Withdrawn) The use of mesenchymal stem cells of claim 13 wherein the cells are transfected to express a gene.

18. (Withdrawn) The use of mesenchymal stem cells of claim 17 wherein the gene encodes a connexin.

19. (Withdrawn) The use of mesenchymal stem cells of claim 18 wherein the connexin is connexin 40.

20. (Withdrawn) The use of mesenchymal stem cells of claim 18 wherein the connexin is connexin 43.

21. (Withdrawn) The use of mesenchymal stem cells of claim 18 wherein the connexin is connexin 45.

22. (Withdrawn) The use of mesenchymal stem cells of claim 17 wherein the gene encodes an alpha and accessory subunits of the L-type calcium channel.

23. (Withdrawn) The use of mesenchymal stem cells of claim 18 further comprising transfecting the cells with a gene encoding an alpha and accessory subunits of the L-type calcium channel.

24. (Withdrawn-Previously Presented) An atrioventricular bypass tract for a heart wherein said tract provides a path for electrical signals generated by the sinus node to propagate across the tract and excite the ventricle, wherein said tract is prepared by a process comprising growing mesenchymal stem cells into a strip having two ends, whereby one end of the strip is attached to the ventricle of a heart and the other end is attached to the atrium of the heart to create the atrioventricular bypass tract.

25. (Withdrawn) The bypass tract of claim 24 wherein the mesenchymal stem cells are adult human mesenchymal stem cells.

26. (Withdrawn) The bypass tract of claim 24 wherein the stem cells are grown in culture on a non-bioactive material.

27. (Withdrawn) The bypass tract of claim 24 wherein the stem cells are grown in an environment substantially free of additional molecular determinants of conduction.

28. (Withdrawn) The bypass tract of claim 24 wherein the cells are transfected with a gene.

29. (Withdrawn) The bypass tract of claim 28 wherein the gene encodes a connexin.

30. (Withdrawn) The bypass tract of claim 29 wherein the connexin is connexin 40.
31. (Withdrawn) The bypass tract of claim 29 wherein the connexin is connexin 43.
32. (Withdrawn) The bypass tract of claim 29 wherein the connexin is connexin 45.
33. (Withdrawn) The bypass tract of claim 28 wherein the gene encodes an alpha and accessory subunits of the L-type calcium channel.
34. (Withdrawn-Previously Presented) The bypass tract of claim 33 further comprising transfecting the cells with a gene encoding an alpha and accessory subunits of the L-type calcium channel.
35. (New) The method of claim 6, wherein the nucleic acid encodes an HCN channel.
36. (New) The method of Claim 35, wherein the HCN channel is HCN2.